



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/034,730 | 12/28/2001 | Tajinder Manku | G&C 119.9-US-U1 | 1382 |
| 22462 | 7590 | 05/24/2005 | EXAMINER | |
| GATES & COOPER LLP HOWARD HUGHES CENTER 6701 CENTER DRIVE WEST, SUITE 1050 LOS ANGELES, CA 90045 | | | PATHAK, SUDHANSHU C | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2634 | |

DATE MAILED: 05/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/034,730

Applicant(s)

MANKU ET AL.

Examiner

Sudhanshu C. Pathak

Art Unit

2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on December 28th, 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on December 28th, 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

1. Claims 1-to-26 are pending on the application.

Specification

2. The specification on Page 4, line 30 discloses referring to Figure 2 element 32 as "LO2", Figure 2 actually refers to element 32 as "LO".
3. The specification on Page 8, "Brief Description of the Drawings" referring to Figure 10 discloses a circuit for generating " ϕ_2 ", this should actually be " ϕ_1 ".
4. The specification on Page 15, line 33, refers to "...channel **VLO** signals...", this should actually be "...channel **LO** signals...".
5. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. Claim 10 recites the limitation "the control signal and oversampling rate" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o).

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
7. Claim 10 recites the limitation "the control signal and oversampling rate" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.
8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 25-26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claims disclose software code for the "fabrication of the signal converter" (as described in the independent claim 1), however, this subject matter is not disclosed in the specification in such a way so as to enable one skilled in the art to which it pertains to make and/or use the invention i.e. it is not clear what the fabrication process includes such as chemical vapor deposition, etching, plasma deposition etc. Furthermore it is not disclosed in the specification if the process is a CMOS or FET or GaAs process of fabrication. The specification does not disclose any details regarding IC fabrication process.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1, 6-7, 15-17, 19, 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Kolber (WO 96/01006).

Regarding to Claims 1, 6-7, 15-17, 19, 21-23, Kolber discloses a signal converter for modulating or demodulating an input signal $x(t)$ (Fig. 1, elements 11, 15 &

Abstract, lines 1-7 & Specification, Page 1, lines 7-22 & Specification, Page 2, lines 18-28 & Fig. 2 & Specification, Page 4, lines 5-9 & Claims 1, 11) comprising: a synthesizer for generating wideband mixing signals ϕ_1 and ϕ_2 (Fig. 2, element 24 & Specification, Page 3, lines 11-25 & Specification, Page 5, lines 18-24) which vary irregularly over time, where $\phi_1 * \phi_2$ has significant power at the frequency of a local oscillator signal being emulated (Fig. 1, element "L.O" & Fig. 2 & Specification, Page 2, lines 18-28 & Specification, Page 3, lines 5-10 & Specification, Page 4, lines 16-22 & Abstract, lines 1-7), a first mixer coupled to said synthesizer for mixing said input signal with said mixing signal ϕ_1 , to generate an output signal $x(t) * \phi_1$ (Fig. 2, element 21 & Abstract, lines 1-7 & Specification, Page 3, lines 11-18 & Specification, Page 4, lines 10-15 & Fig. 3A-3C & Claims 1, 11); and a second mixer coupled to said synthesizer and to the output of said first mixer for mixing said signal $x(t) * \phi_1$ with said mixing signal ϕ_2 to generate an output signal $x(t) * \phi_1 * \phi_2$ (Fig. 2, element 26 & Abstract, lines 1-7 & Specification, Page 3, lines 18-25 & Specification, Page 4, lines 27-31 & Specification, Page 5, lines 1-2 & Fig. 3D-3F & Claims 1, 11). Kolber also discloses the wideband signals generated by the synthesizer to randomly generate the mixing signals (Specification, Page 4, lines 16-22 & Specification, Page 5, lines 18-24 & Fig. 2, element 24). Kolber also discloses the synthesizer uses a single time base to generate both the mixing signals (Fig. 2, elements 22, 24, 27, 28 & Specification, Page 5, lines 3-10). Kolber also discloses the local oscillator coupled to the synthesizer for providing a signal having a frequency that is an integral multiple of the desired mixing frequency (Specification, Page 1, lines 18-28

& Specification, Page 4, lines 11-15, 27-31 & Specification, Page 5, lines 1-5).

Kolber also discloses the synthesizer generating mixing signals wherein the first wideband mixing signal ϕ_1 being a much higher frequency than the second wideband mixing signal ϕ_2 (Specification, Page 4, lines 10-15, 27-31 & Specification, Page 5, lines 1-5 & Fig. 2, elements 22, 27).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kolber (WO 96/01006) in view of Marz (5,390,346).

Regarding to Claim 2, Kolber discloses a signal converter for modulating or demodulating an input signal comprising a synthesizer for generating wideband mixing signals which vary irregularly over time and the product of which has significant power at the frequency of the local oscillator being emulated; a first mixer for mixing the input signal with a first wideband signal; and a second mixer for mixing the output of the first mixer with the second wideband signal, to generate an output signal which is a product of the input signal and the two wideband signal, in the time domain as described above. Kolber further discloses the local oscillator signal to be a pseudo random spreading function which could be of various types including frequency hopping and chirp type spreading functions (Specification, Page 4, lines

16-22). Kolber also discloses multiple spreading function generators can be implemented for the multiple local oscillator signals for the demodulation or modulation of received signals (Specification, Page 5, lines 18-24). However, Kolber does not explicitly specify implementing the local oscillator (wideband) signals to have different patterns.

Marz discloses a double frequency converter comprising a first and second local oscillator synthesizer (Abstract, lines 1-6 & Fig. 1). Marz further discloses the programmable synthesizer generates the LO signal from the received reference (pattern) and the received control signal (desired frequency) for each of local oscillators (Column 4, lines 60-68 & Column 5, lines 11-17). Marz also discloses each of the reference signals for each of the local oscillators can be generated from a single source or separate remote independent sources. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Marz teaches implementing the local oscillators with different reference signals (pattern) and this can be implemented in the signal converter as described in Kolber so as to demodulate and despread the incoming signals simultaneously, thus satisfying the limitations of the claim. Furthermore, there is no criticality in selecting the first and second wideband signals to be of different patterns since the downconverting and/or upconverting is performed in the frequency domain, this is a matter of design choice for the application of the receiver to be in a direct sequence spread spectrum system.

Regarding to Claims 3-5, Kolber in view of Marz discloses a signal converter for modulating or demodulating an input signal comprising a synthesizer for generating wideband mixing signals which vary irregularly over time and the product of which has significant power at the frequency of the local oscillator being emulated wherein the wideband signals have different patterns; a first mixer for mixing the input signal with a first wideband signal; and a second mixer for mixing the output of the first mixer with the second wideband signal, to generate an output signal which is a product of the input signal and the two wideband signal, in the time domain as described above. Kolber further discloses the wideband signals generated by the synthesizer φ_1 & φ_2 where neither of the wideband signals have significant power at the frequency of the local oscillator signal being emulated and further where $\varphi_1 * \varphi_2$ and $\varphi_1 * \varphi_1 * \varphi_2$ does not have significant power within the bandwidth of the input signal at baseband thereby reducing the effects of local oscillator leakage (Fig. 2, elements 22, 27 & Specification, Page 4, lines 10-31 & Specification, Page 5, lines 1-10 & Fig. 3A-3F). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Kolber teaches that each of the wideband signals implemented as local oscillator signals do not have significant power at the local oscillator signal being emulated, thus satisfying the limitations of the claim.

14. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kolber (WO 96/01006) in view of Itoh et al. (5,787,126).

Regarding to Claim 8, Kolber discloses a signal converter for modulating or demodulating an input signal comprising a synthesizer for generating wideband

mixing signals which vary irregularly over time and the product of which has significant power at the frequency of the local oscillator being emulated; a first mixer for mixing the input signal with a first wideband signal; and a second mixer for mixing the output of the first mixer with the second wideband signal, to generate an output signal which is a product of the input signal and the two wideband signal, in the time domain wherein the wideband mixing signals are generated pseudo-randomly as described above. However, Kolber does not disclose the synthesizer to further comprise shaping the spectrum of the mixing signals.

Itoh discloses a filter to shape the spectrum of the local oscillator signal (Fig. 28, element 51 & Fig. 29 & Column 13, lines 65-67 & Column 14, lines 1-10). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Itoh discloses a filter to shape the spectrum of the local oscillator signal and this can be implemented in the signal converter as described in Kolber so as to avoid interference signals from leaking into the receiving chain, thus satisfying the limitation of the claim.

15. Claims 9 –14, 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kolber (WO 96/01006) in view of Itoh et al. (5,787,126) in further view of the Applicant Admitted Prior Art (AAPA).

Regarding to Claims 9 – 14, 18, Kolber in view of Itoh discloses a signal converter for modulating or demodulating an input signal comprising a synthesizer for generating wideband mixing signals which vary irregularly over time and the product of which has significant power at the frequency of the local oscillator being

emulated wherein the synthesizer further comprises a filter to shape the spectrum of the mixing signals; a first mixer for mixing the input signal with a first wideband signal; and a second mixer for mixing the output of the first mixer with the second wideband signal, to generate an output signal which is a product of the input signal and the two wideband signal, in the time domain wherein the wideband mixing signals are generated pseudo-randomly as described above. Kolber further discloses the signal converter further comprising a filter for removing unwanted signal components from the output of the first mixer, $x(t) * \phi_1$ (Fig. 2, element 23). However, Kolber in view of Itoh does not disclose the synthesizer to further comprise a delta sigma block for generating the mixing signals.

The Applicant Admitted Prior Art (AAPA) discloses a delta sigma modulator for the design of digital to analog converters and analog to digital converters (Specification, Page 13, lines 32-34 & Specification, Page 14, lines 5-7). The AAPA also discloses a delta sigma modulator to produce a pseudo-random bit stream (Specification, Page 16, lines 3-5). The AAPA also discloses the clock of the delta sigma determines the oversampling rate of the delta sigma block (Specification, Page 16, lines 4-5). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the AAPA teaches implementing a delta sigma modulator to generate a pseudo random bit stream and this can be implemented in the synthesizer as described in Kolber in view of Itoh so as to generate wideband mixing signals, thus satisfying the limitations of the claims. Furthermore, there is no criticality in varying the oversampling rate of the delta sigma

modulator and the mixing signals over time, this is a matter of design choice depending on the quantization noise desired and the level of the input signal of the application so as to provide an optimum delta sigma modulator. Furthermore, there is no criticality in selecting the wideband mixing signals to be periodic; this is a matter of design choice depending on the application.

16. Claims 20, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kolber (WO 96/01006) in view of Manku et al. (6,148,184).

Regarding to Claims 20, 24, Kolber discloses a signal converter for modulating or demodulating an input signal comprising a synthesizer for generating wideband mixing signals which vary irregularly over time and the product of which has significant power at the frequency of the local oscillator being emulated; a first mixer for mixing the input signal with a first wideband signal; and a second mixer for mixing the output of the first mixer with the second wideband signal, to generate an output signal which is a product of the input signal and the two wideband signal, in the time domain wherein the wideband mixing signals are generated pseudo-randomly as described above. However, Kolber does not disclose the either one of the mixing signals to mix 90 degrees out of phase thereby generating an in-phase and quadrature components of the input signal and further the converter is implemented as an integrated circuit.

Manku discloses implementing the down converter implemented as an integrated circuit (Column 3, lines 17-24). Manku also discloses mixing signals to mix 90 degrees out of phase thereby generating an in-phase and quadrature components of

the input signal (Fig. 1, elements 10-17 & Claim 1 (Column 4, lines 1-9)). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Manku teaches mixing the input signal with an local oscillator signal 90 degrees out of phase so as to generate an in-phase component and a quadrature component of the input signal and further implementing the converter as an integrated circuit and this can be implemented as the converter as described in Kolber so as to provide an highly integrated transceiver requiring fewer and less complex components, thus satisfying the limitations of the claims.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure, it is recommended to the applicant to amend all the claims so as to be patentable over the cited prior art of record. A detailed list of pertinent references is included with this Office Action (See Attached "Notice of References Cited" (PTO-892)).


18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (571)-272-3038. The examiner can normally be reached on M-F: 9am-6pm.

- If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571)-272-3056
- The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2634

- Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sudhanshu C. Pathak



STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600